

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 1) The values of an analog signal flow smoothly from one to the next. 1) _____
- 2) A sinusoidal waveform is an analog signal. 2) _____
- 3) Digital data can be processed and transmitted more efficiently and reliably than analog information. 3) _____
- 4) The field that comprises both mechanical and electronic components is known as electro-mechanics. 4) _____
- 5) The decimal number system uses nine different symbols. 5) _____
- 6) The binary number system uses just two symbols. 6) _____
- 7) A waveform that repeats itself at fixed intervals is called a *periodic* waveform. 7) _____
- 8) Digital systems respond to voltage levels that change abruptly between two levels (high and low). 8) _____
- 9) The amplitude of a digital waveform is the difference in voltage between the LOW and HIGH levels. 9) _____
- 10) The clock signal synchronizes the other waveforms in a circuit. 10) _____
- 11) Clock signals carry pieces of information such as letters and numbers. 11) _____
- 12) Serial data is sent along a single conductor, one bit at a time. 12) _____
- 13) Parallel data is sent along a single conductor, one bit at a time. 13) _____
- 14) When the inputs to a 2-input AND gate are both HIGH, the output is HIGH. 14) _____
- 15) When either input to a 2-input AND gate is LOW, the output is LOW. 15) _____
- 16) When either input to a 2-input OR gate is HIGH, the output is HIGH. 16) _____
- 17) When both inputs to a 2-input OR gate are both LOW, the output is LOW. 17) _____
- 18) When the input to a logic inverter is HIGH, the output is LOW. 18) _____
- 19) Encoders and decoders perform opposite conversions. 19) _____
- 20) A multiplexer converts parallel data to serial data. 20) _____
- 21) A demultiplexer is sometimes called a *mux*. 21) _____
- 22) A flip-flop is a 1-bit storage device. 22) _____
- 23) The DIP package style has two parallel rows of through-hole pins. 23) _____

- 24) The PLCC package has J-type leads on all four edges. 24) _____
- 25) The flat-pack (FP) IC package style is a surface-mount device. 25) _____
- 26) The FPGA is a fixed-function device. 26) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 27) A circuit that converts an analog waveform to a digital signal is commonly called a(n) _____. 27) _____
 A) DAC B) PLD C) ADC D) CAD
- 28) A circuit that converts an digital signal to an analog waveform is commonly called a(n) _____. 28) _____
 A) DAC B) CAD C) ADC D) PLD
- 29) Of the circuits listed, the one that is most likely to be found in a CD player is a(n) _____. 29) _____
 A) SPLD B) digital-to-analog converter
 C) programmable logic device D) analog-to-digital converter
- 30) On a negative-going pulse, _____. 30) _____
 A) HIGH = 0 and LOW = -1 B) LOW = -1 and HIGH = 1
 C) HIGH = 1 and LOW = 0 D) HIGH = 0 and LOW = 1
- 31) On a digital waveform, the transition time from a LOW level to a HIGH level is called _____. 31) _____
 A) fall time B) period C) pulse width D) rise time

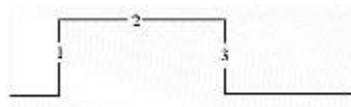


Figure 1-1

- 32) Which edge in Figure 1-1 is the leading edge? 32) _____
 A) 1 B) 2 C) 3 D) Both 1 and 3
- 33) Which edge in Figure 1-1 is the trailing edge? 33) _____
 A) 1 B) 2 C) 3 D) Both 1 and 3
- 34) The time between transition 1 and transition 3 in Figure 1-1 is the _____. 34) _____
 A) pulse width B) frequency C) period D) amplitude
- 35) On a digital waveform, the transition time from a HIGH level to a LOW level is called _____. 35) _____
 A) fall time B) rise time C) pulse width D) period
- 36) The time from one leading edge on a digital waveform to the next is the waveform _____. 36) _____
 A) pulse width B) period C) rise time D) fall time
- 37) A periodic digital waveform _____. 37) _____
 A) repeats itself at a fixed interval B) has both a HIGH and LOW levels
 C) has a duty cycle D) all of the above
- 38) The transition times for an ideal digital pulse are _____. 38) _____
 A) measured between 0 and 90% of the amplitude

- B) measured between 10% to 90% of the amplitude
- C) infinite
- D) zero

39) An oscilloscope display indicates that the period of a digital waveform is 40 μ s. What is frequency of this waveform? 39) _____

- A) 40 MHz
- B) 2.5 kHz
- C) 25 kHz
- D) The frequency cannot be determined using the information provided.

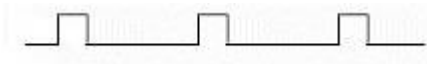
40) What is the duty cycle of a digital waveform with a pulse width of 10 ms a period of 90 ms? 40) _____

- A) 11.1%
- B) 10%
- C) 9%
- D) 90%

41) On a positive-going pulse, the leading edge is the _____. 41) _____

- A) falling edge
- B) negative-going edge
- C) HIGH-to-LOW transition
- D) positive-going edge

42) The approximate duty cycle for the digital waveform below is _____. 42) _____



- A) 80%
- B) 20%
- C) 30%
- D) 50%

43) On a negative-going pulse, the leading edge is the _____. 43) _____

- A) LOW-to-HIGH transition
- B) negative-going edge
- C) positive-going edge
- D) rising edge

44) On a positive-logic pulse, the trailing edge is the _____. 44) _____

- A) rising edge
- B) falling edge
- C) positive-going edge
- D) LOW-to-HIGH transition

45) On a negative-logic pulse, the trailing edge is the _____. 45) _____

- A) HIGH-to-LOW transition
- B) positive-going edge
- C) falling edge
- D) negative-going edge

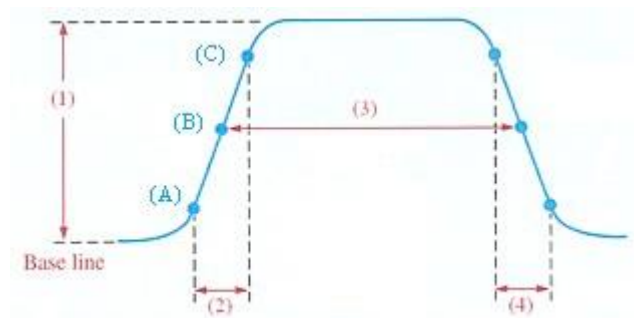


Figure 1-2

46) Item (1) of the nonideal pulse in Figure 1-2 represents the waveform _____. 46) _____

- A) transition time
- B) amplitude
- C) period
- D) pulse width

47) Item (2) of the nonideal pulse in Figure 1-2 represents the waveform _____. 47) _____

- A) amplitude
- B) rise time
- C) fall time
- D) pulse width

- 48) Item (3) of the nonideal pulse in Figure 1-2 represents the waveform _____. 48) _____
 A) amplitude B) rise time C) fall time D) pulse width
- 49) Item (4) of the nonideal pulse in Figure 1-2 represents the waveform _____. 49) _____
 A) amplitude B) rise time C) fall time D) pulse width
- 50) When data is set along a single conductor, it is referred to as _____. 50) _____
 A) parallel data B) simultaneous data
 C) serial data D) none of these

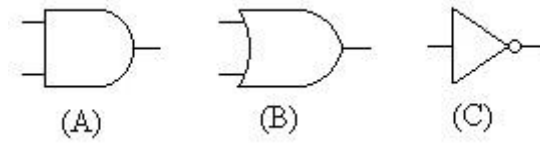


Figure 1-3

- 51) The symbol in Figure 1-3(A) represents the _____ function. 51) _____
 A) AND B) NOT C) OR D) AND/OR
- 52) The symbol in Figure 1-3(B) represents the _____ function. 52) _____
 A) AND B) NON C) XOR D) OR
- 53) The symbol in Figure 1-3(C) represents the _____ function. 53) _____
 A) NOT B) XOR C) OR D) AND
- 54) The output from an AND gate is HIGH when _____. 54) _____
 A) all inputs are LOW
 B) one input is LOW and the remaining inputs are HIGH
 C) one input is HIGH and the remaining inputs are LOW
 D) all inputs are HIGH
- 55) The output from an AND gate is LOW _____. 55) _____
 A) when at least one input is LOW B) only when all inputs are HIGH
 C) only when all inputs are LOW D) none of the above
- 56) The output from an OR gate is HIGH _____. 56) _____
 A) when at least one input is HIGH B) only when all inputs are LOW
 C) only when all inputs are HIGH D) none of the above
- 57) The output from an OR gate is LOW _____. 57) _____
 A) whenever any input is HIGH B) only when all inputs are HIGH
 C) only when all inputs are LOW D) none of the above
- 58) Which circuit creates an output that indicates whether or not the input values are equal? 58) _____
 A) Comparator B) Encoder C) Decoder D) Multiplexer
- 59) Which circuit converts information into a specific coded form? 59) _____
 A) Comparator B) Encoder C) Decoder D) Multiplexer
- 60) Which circuit converts coded information into a noncoded form? 60) _____
 A) Comparator B) Encoder C) Decoder D) Multiplexer

- 61) Which circuit converts data from serial form to parallel form? 61) _____
 A) Comparator B) Demultiplexer C) Encoder D) Multiplexer
- 62) Which one of the following is not a binary arithmetic function? 62) _____
 A) Addition B) Multiplexing C) Division D) Subtraction
- 63) Two kinds of data selectors are _____ and _____. 63) _____
 A) encoders, decoders B) multiplexers, demultiplexers
 C) adders, subtractors D) comparators, registers
- 64) Which one of the circuits listed is made up of flip-flops? 64) _____
 A) A multiplexer B) A comparator C) A register D) A converter

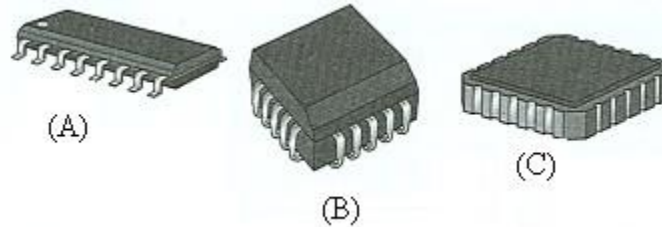
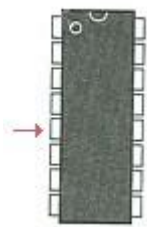


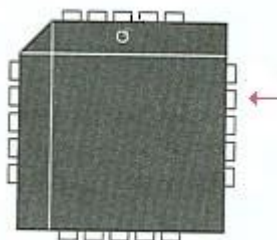
Figure 1-4

- 65) The package style in Figure 1-4(A) is a(n) _____. 65) _____
 A) SOIC B) PLCC C) LCCC D) FP
- 66) The package style in Figure 1-4(B) is a(n) _____. 66) _____
 A) SOIC B) PLCC C) LCCC D) FP
- 67) The package style in Figure 1-4(C) is a(n) _____. 67) _____
 A) SOIC B) PLCC C) LCCC D) FP
- 68) The arrow in the figure below points to pin number _____. 68) _____



- A) 5 B) 13 C) 12 D) 4

- 69) The arrow in the figure below points to pin _____. 69) _____



- A) 4 B) 17 C) 16 D) 5

- 70) Which IC package style has no leads? 70) _____
A) PLCC B) LCCC
C) SOIC D) All must have leads.
- 71) Which one of the following is not a surface-mount IC package? 71) _____
A) PLCC B) DIP C) FP D) SOIC
- 72) The first step in the PLD programming process is _____. 72) _____
A) design entry B) compilation C) synthesis D) download
- 73) The final step in the PLD programming process is _____. 73) _____
A) design entry B) compilation C) synthesis D) download
- 74) The netlist is generated during the _____ phase of the PLD programming process. 74) _____
A) design entry B) compilation C) synthesis D) download
- 75) Which of the following is an example of a mechatronics system? 75) _____
A) An industrial robot B) A surgical laser
C) A laptop computer D) None of the above

- 1) TRUE
- 2) TRUE
- 3) TRUE
- 4) FALSE
- 5) FALSE
- 6) TRUE
- 7) TRUE
- 8) TRUE
- 9) TRUE
- 10) TRUE
- 11) FALSE
- 12) TRUE
- 13) FALSE
- 14) TRUE
- 15) TRUE
- 16) TRUE
- 17) TRUE
- 18) TRUE
- 19) TRUE
- 20) TRUE
- 21) FALSE
- 22) TRUE
- 23) TRUE
- 24) TRUE
- 25) TRUE
- 26) FALSE
- 27) C
- 28) A
- 29) B
- 30) D
- 31) D
- 32) A
- 33) C
- 34) A
- 35) A
- 36) B
- 37) D
- 38) D
- 39) C
- 40) A
- 41) D
- 42) B
- 43) B
- 44) B
- 45) B
- 46) B
- 47) B
- 48) D
- 49) C
- 50) C
- 51) A

- 52) D
- 53) A
- 54) D
- 55) A
- 56) A
- 57) C
- 58) A
- 59) B
- 60) C
- 61) B
- 62) B
- 63) B
- 64) C
- 65) A
- 66) B
- 67) C
- 68) A
- 69) B
- 70) B
- 71) B
- 72) A
- 73) D
- 74) C
- 75) A